

Chapter Two

Regional Erosion and Revegetation Assessment - Task Two

Erosion and Revegetation Site Analyses

Beginning in March of 1999, The Watershed Institute staff initiated an erosion and revegetation assessment along the Big Sur Coast beginning at Carmel and ending at the Monterey/San Luis Obispo County line. In order to evaluate the sites, we developed a Site Assessment and Prioritization Form. The form contained the field notes necessary to accomplish the site analyses and erosion assessments; the sites were ranked in terms of importance, urgency, and trend. The overall assessment criteria consisted of a list of potential impacts to the highway, soils, vegetation, or habitat that could occur in the advent of an erosion event. A botanical inventory was also conducted on and adjacent to each site and was incorporated into the form. The inventory was used to define the revegetation specifications, the ultimate species used for revegetation, as well as identify the presence or absence of environmentally sensitive resources.

Prioritization of Sites

Sites were chosen by visual survey along Highway One. Prioritization was defined by developing a profile for the primary ten sites. We established criteria including the location of the site, severity of the erosion, relative threat to the highway, and the potential threat to environmentally sensitive resources. Our evaluations were also based on erosion classification; i.e. barren soil surface, rill and gully present, temporary stockpiling, and drainage problems.

Importance, Urgency, Trend

Classification of the sites was accomplished by the Watershed Institute staff with the aid of regional biologists and restoration specialists. Each person walked the site, noted site conditions, and when prompted, gave a number between one and ten (best to worst condition) for importance (rating of importance of threat to the highway, habitats of concern, or viewshed), urgency (rating of how quickly response should be to this site because of the noted conditions), and trend (if left without treatment, what results would be anticipated). (Fig. 2.1 - 2.2)

Assessment Tool Application

The use of the assessment tool allowed the survey team to conclude several things. First, it helped to standardize visual criteria between many different professions, making it a fairly simple task to collect observations of scientists from many different backgrounds and experience. Second, the tool helped to prioritize sites for later analysis and for comparison between sites along the coast. Comparison is important and site ranking should be considered in choosing best management practices for each site. For example, at the McWay site, perennial vegetation establishment was attempted on a site with unconsolidated fill that experienced a significant landslide event one day after substantial hydroseeding work. If the ranked site had been understood in its importance, urgency, and trend, temporary vegetation practices would probably have been most appropriate and economically justifiable. And third, it established a framework to return and monitor sites by the same criteria. The tool can also be refined in the future as sites are continually monitored.

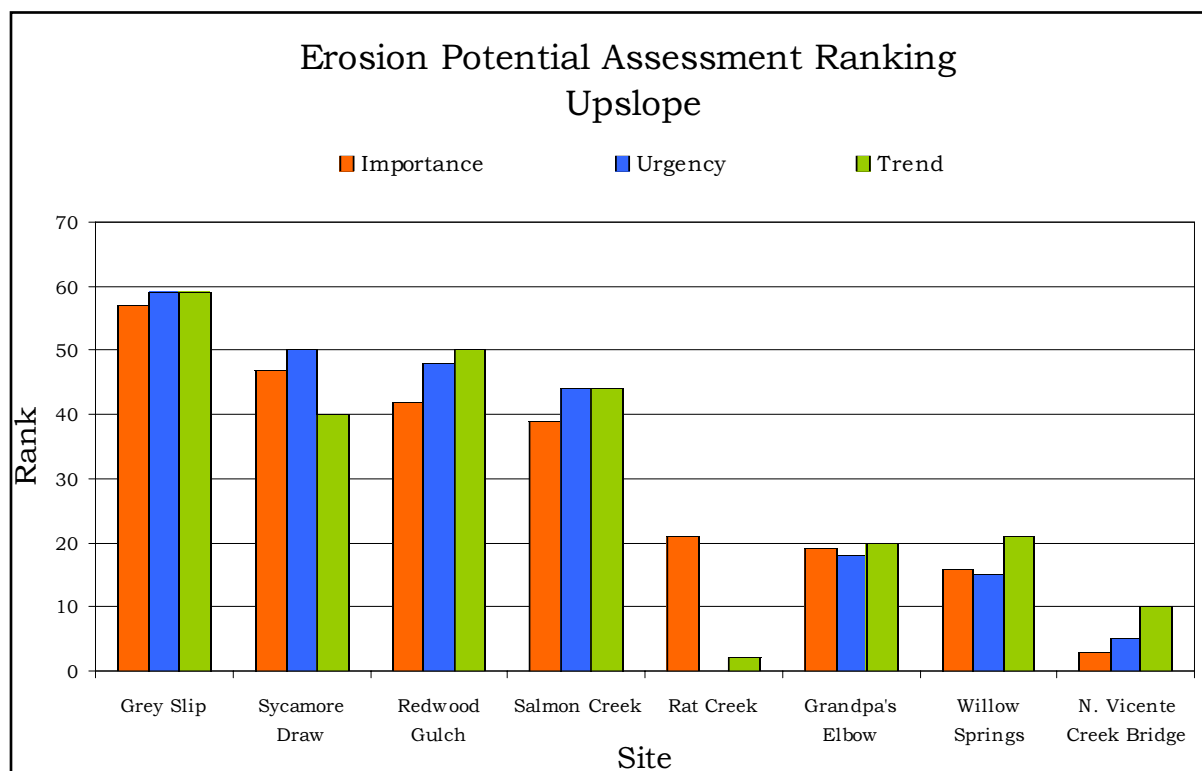


Figure 2.1. Erosion assessment ranking for upslope (East of highway).

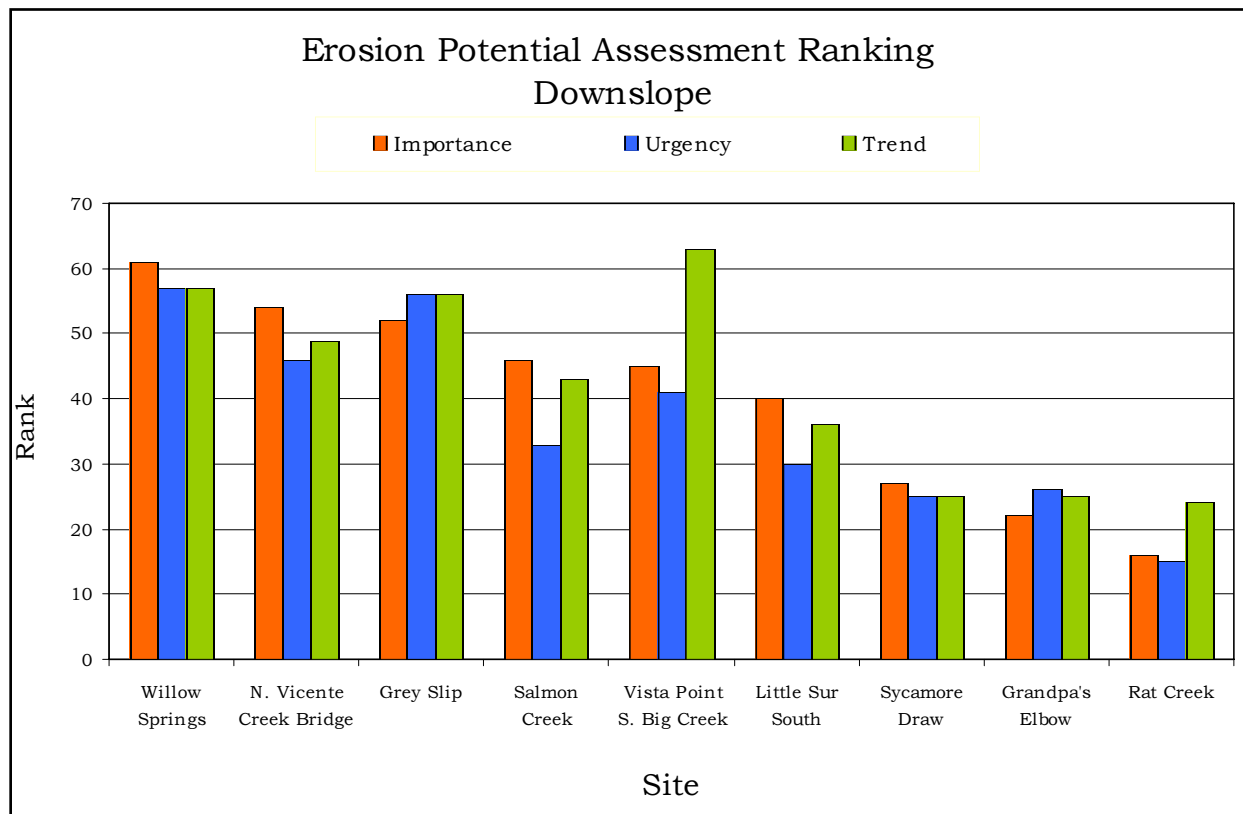


Figure 2.2. Erosion assessment ranking for down slope (West of highway).

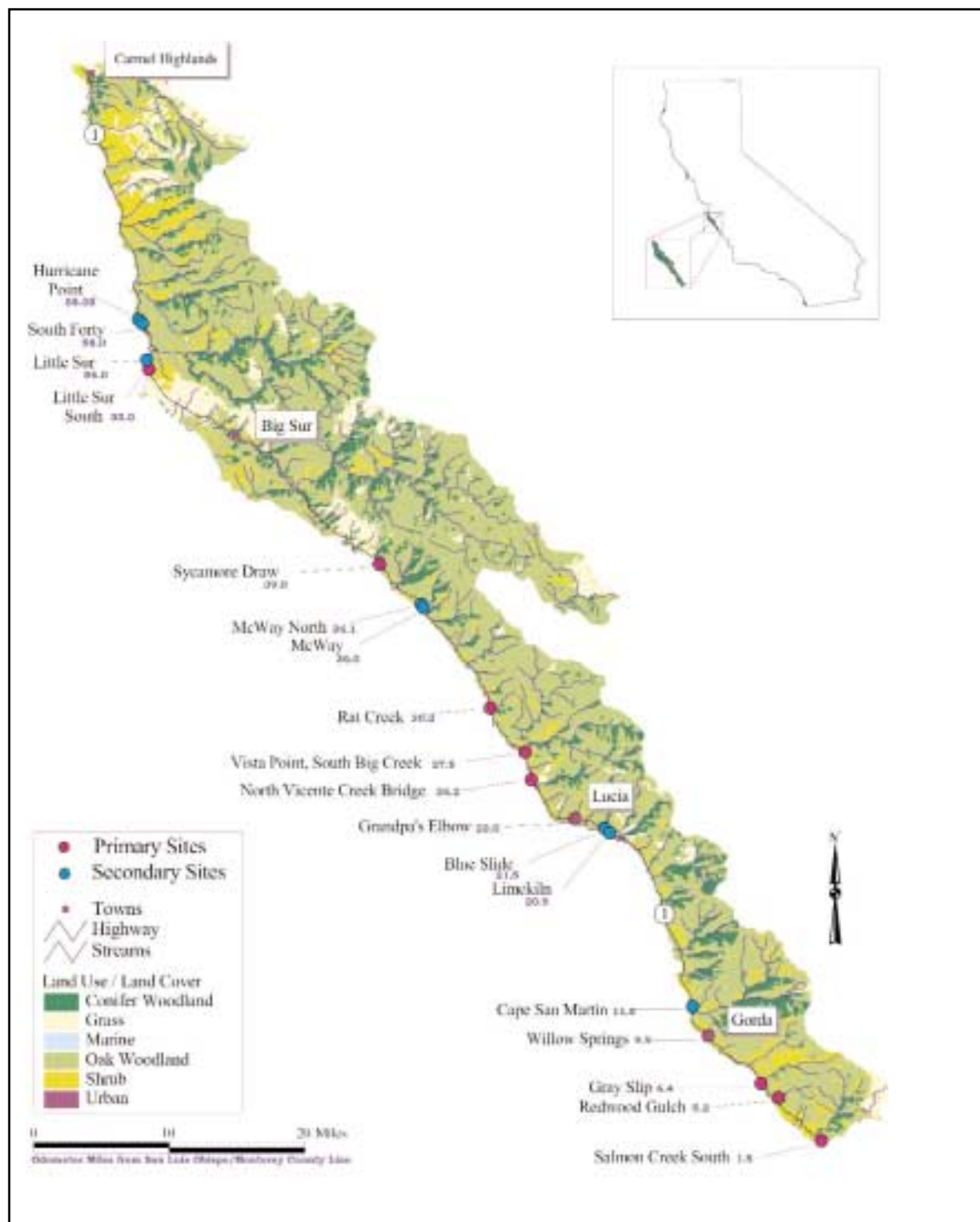


Figure 2.3. Regional landslide and erosion site map for the Big Sur Coast.

Use of GPS and GIS mapping

(GIS) Geographic Information System is a computerized system used for capturing, storing, integrating, analyzing, and displaying data related to positions on the Earth's surface. It is used typically for generating and manipulating multi-layered maps. A regional map was developed that is linked to GPS location data particular to each identified site (Fig. 2.3).

Overall Ranking of Sites

The following table (Table 2.1) shows the ranking of all sites using the assessment tool. This combines importance, urgency, trend, and upslope and downslope. Importance, urgency, and trend, are useful analysis tools to understand why a site is ranked comparatively. The individual sites are discussed in the following pages.

Table 2.1. Erosion assessment rank showing combined total score. Larger number indicates higher potential for erosion impacts.

Site	Assessment Rank
Grey Slip	339
Salmon Creek	268
Willow Springs	227
Sycamore Draw	214
N. Vicente Creek Bridge	167
Vista Point S. Big Creek	149
Redwood Gulch	140
Grandpa's Elbow	130
Little Sur South	106
Rat Creek	78

Primary Erosion and Revegetation Sites

Ten primary sites were chosen on the first assessment trip made in spring 1999, and are those sites selected as part of the scope of this study defined by Task 2. Subsequent trips made the Watershed staff aware of eight secondary sites that need future evaluation.

Little Sur South



Figure 2.4. Little Sur South, February 2000.

Table 2.2. Erosion Site Analysis worksheet for Little Sur South.

Caltrans Erosion Site Analyses		Little Sur - south					
SLO County Line Mile Post Marker		55					
Photo-Reference Number							
Site Conditions		lack of vegetation below recently installed crib wall					
Habitat Type		Dune, bluff scrub					
Soil Type		sand stone, sand dune					
Slope		50%-60%					
Aspect		West					
Sensitive habitat present		Marine, <i>Arctostaphylos edmundsii</i>					
Regional and Neighboring Property Owners		Jim Hill					
Potential Occurrence of Rare Plant and Animal Species							
<i>Eriogonum parvifolium</i>							
Smith's blue butterfly							
<i>Arctostaphylos edmundsii</i>							
Exotic Species Present (threat)		iceplant					
Potential Occurrence of Cultural Artifacts							
none							
		Importance					
		Urgency					
		Trend					
POTENTIAL FOR EROSION EVENT		(rank 1-10)	up slope down slope up slope down slope up slope down slope				
Erosion Hazard		0	8	0	2	0	2
Potential slope failure		0	4	0	2	0	2
Baren soil surface rill and gully erosion present		0	8	0	2	0	2
Baren soil surface (temporary stockpiling)		0	0	0	0	0	0
Potential impacts to sensitive habitat		0	2	0	2	0	8
Potential impacts to engineered drainage and/or conveyance structure		0	2	0	2	0	2
Potential erosion control device (treatment) failure		0	2	0	2	0	2
Drainage problem source		0	2	0	2	0	2
Exotic species invasions		0	6	0	8	0	8
Revegetation		0	6	0	8	0	8
TOTAL		0	40	0	30	0	36



Figure 2.5 Detail of slope from road looking south.



Figure 2.6. Cracks evident in pavement need monitoring.

Table 2.3. Restoration Recommendations for Little Sur South.

Site # 4 Little Sur South					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Restoration Recommendations		
			Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization			Redirect surface water flow across highway	<i>Lupinus albifrons, Festuca rubra, Erigeron glaucus</i>	
			Rill and gully erosion repair downslope		Is site stable?
Revegetation	Hydroseed south flank of downslope		Once surface water flow redirected, hydroseed	Plant willow at toe of downslope	Is site vegetated with a diversity of species present?
	Plant cypress trees to stabilize soils				
Site Maintenance	Downslope exotic species present: kikuya grass		Control of exotic species	Vegetate berms with low growing annuals or perennial grasses	Monitor cracks in pavement
					Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	No erosion present		Site maintenance actions recorded	Submittals review/ specified materials at hand	Project completed, success criteria achieved-Final Recommendations
	Erosion present/ recommendations			Specified materials not available/ specify alternates	Project not completed- remedial measures required

Sycamore Draw



Figure 2.7. Sycamore Draw, February 2000.

Table 2.4. Erosion Site Analysis worksheet for Sycamore Draw.

Caltrans Erosion Site Analyses		Sycamore Draw					
SLO County Line Mile Post Marker	39						
Photo-Reference Number	1-01, 1-02						
Site Conditions	eroding slope, debris eroding near bridge structure, 10 acres of broom, pampas, some fennel						
Habitat Type	Central Coast Scrub						
Soil Type	Bedrock and landslide debris						
Slope	85%						
Aspect	West/Southwest						
Sensitive habitat present	Smith's blue						
Regional and Neighboring Property Owners	Pat Billig, Jeremy Wilson, USFS						
Potential Occurance of Rare Plant and Animal Species							
Riparian draws, Red-legged frog, Sea otter habitat, intertidal animals threatned by erosion							
Smith's blue butterfly							
Eriogonum parvifolium							
Exotic Species Present (threat)							
Pennisetum clandestinum, Foeniculum vulgare, Genista monspessulanna, Centaria melitensis,							
Potential Occurance of Cultural Artifacts							
Skinner Peirce body, native American midden off-site USFS							
		Importance		Urgency		Trend	
<u>POTENTIAL FOR EROSION EVENT</u>	<u>[rank 1-10]</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard		6	4	8	3	3	2
Potential slope failure		0	0	0	0	0	0
Baren soil surface rill and gully erosion present		8	3	8	3	8	5
Baren soil surface (temporary stockpiling)		7	2	9	2	9	2
Potential impacts to sensitive habitat		5	2	2	0	2	0
Potential impacts to engineered drainage and/or conveyance structure		5	2	8	2	3	2
Potential erosion control device (treatment) failure		7	2	7	2	7	2
Drainage problem source	Attempted drainage failed	0	0	0	0	0	0
Exotic species invasions		2	9	2	9	2	9
Revegetation		7	3	6	4	6	3
TOTAL		47	27	50	25	40	25



Figure 2.8. Picture on left shows the Pampas grass growing on site, and the picture on the right shows bare surface soil that needs to be stabilized.



Figure 2.9.
Long shot looking north.

Figure 2.10. View of upslope showing pampas grass and bare soil.



Table 2.5. Restoration Recommendations for Sycamore Draw.

Site #5 Sycamore Draw					
Restoration Recommendations					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization			Rill and gully erosion repaired		Is site stable?
	Anchor toe of slope where slippage occurs downslope		Control surface water flow from upslope side of highway-prevent discharge under guard rail through non-controlled structure	<i>Elymus glaucus</i> , <i>Eriophyllum</i> <i>steachadifloium</i> , <i>Eriogonum</i> <i>parvifolium</i> , <i>Bromus</i> <i>carinatus</i> , <i>Lotus purshianus</i>	Monitor headcuts of slope under guard rail.
Revegetation		Willow pole cuttings in seeps and springs downslope		Hydroseed upslope. Apply straw downslope to protect surface.	Is site revegetated with a diversity of species present?
Site Maintenance	Stabilize cut on downslope of road		Exotic control: Fennel, Pampas grass, Genista downslope		Are all non-biodegradable elements removed?
	Plug willows at base of cut				Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	No erosion present		Site maintenance actions recorded	Submittals review/ specified materials at hand	Project completed, success criteria achieved-Final Recommendations
	Erosion present/ recommendations			Specified materials not available/ specify alternates	Project not completed-remedial measures required

Rat Creek

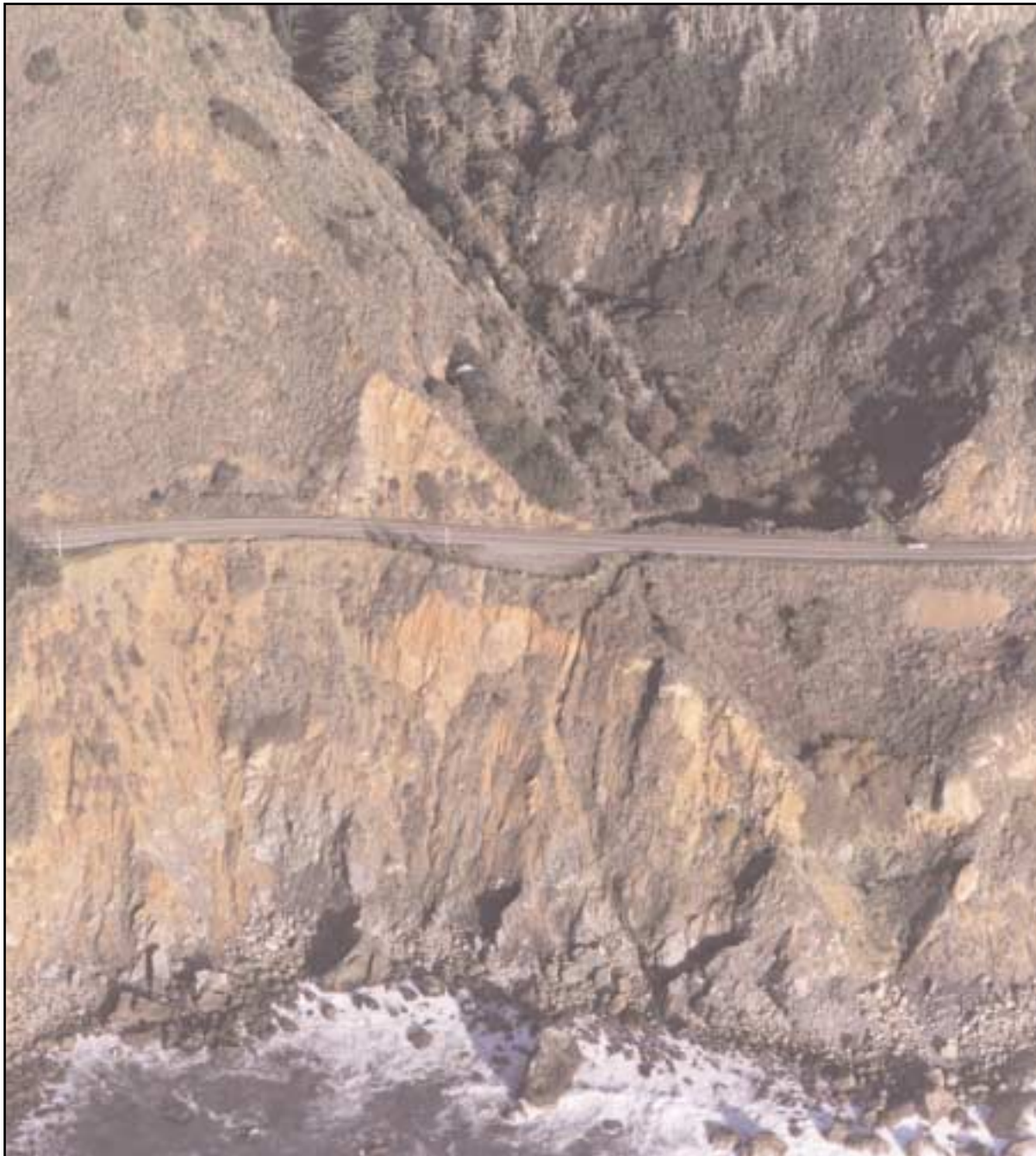


Figure 2.11. Rat Creek, February 2000.

Table 2.6. Erosion Site Analysis worksheet for Rat Creek.

Caltrans Erosion Site Analyses		Rat Creek					
SLO County Line Mile Post Marker		30.2					
Photo-Reference Number		2-01, 2-02					
Site Conditions		slumping downslope, road bank failure					
Habitat Type		Central Coast Scrub					
Soil Type		Decomposed granite					
Slope		50-60%					
Aspect		Southwest					
Sensitive habitat present		Smith's blue					
Regional and Neighboring Property Owners		Jack O'Neil, Big Creek Reserve					
Potential Occurance of Rare Plant and Animal Species							
Smith's blue butterfly							
Eriogonum parvifolium							
Exotic Species Present (threat)							
Pennisetum clandestinum, Foeniculum vulgare, Genista monspessulana							
Potential Occurance of Cultural Artifacts							
none							
		Importance		Urgency		Trend	
<u>POTENTIAL FOR EROSION EVENT</u>		<u>(rank 1-10)</u>		<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard		10	3	0	3	0	3
Potential slope failure		10	0	0	1	0	3
Baren soil surface rill and gully erosion present		1	3	0	3	2	5
Baren soil surface (temporary stockpiling)		0	0	0	0	0	0
Potential impacts to sensitive habitat		0	2	0	2	0	3
Potential impacts to engineered drainage and/or conveyance structure		0	2	0	2	0	3
Potential erosion control device (treatment) failure		(treatment failure)	0	0	0	0	0
Drainage problem source		Attempted drainage failed	0	0	0	0	0
Exotic species invasions			0	2	0	1	0
Revegetation			0	4	0	3	0
TOTAL			21	16	0	15	2



Figure 2.12. Pictures showing bare unstable soil and pavement cracks. Surface water flow may be adding to erosion problems.



Figure 2.13. Long-shot looking north showing up slope.

Table 2.7. Restoration Recommendations for Rat Creek.

Site Objective	Revegetation	Applications	Actions	Revegetation
Site Stabilization			Redirect water flow from upslope side of highway to control structure Rill and gully erosion repaired downslope	<i>Salix stiche</i> <i>Eriophylla</i> <i>staechadifolia</i> <i>Eriogonum parviflorum</i> <i>Melica imrayana</i>
Revegetation	Hydroseed upslope with perennial mix		After kikuya grass controlled, hydroseed downslope	Hydroseed upslope perennial
Site Maintenance			Control exotic species- Pampas grass, fennel, and kikuya grass	
Project Reporting	No erosion present		Site maintenance actions recorded	Submittals re specified materials hand

Vista Point, South Big Creek



Figure 2.14. Vista Point South Big Creek, February 2000.

Table 2.8. Erosion Site Analysis worksheet for Vista Point south of Big Creek.

Caltrans Erosion Site Analyses		Vista Point south of Big Creek						
SLO County Line Mile Post Marker		27.5						
Photo-Reference Number		12-01, 12-02, 12-03, 12-04, 12-05						
Site Conditions		overcast slumping down to beach, exposed telephone cable, slump in road, headcut of canyon up to highway edge						
Habitat Type		Central Coast Scrub						
Soil Type		Franciscan , decomposed conglomerate						
Slope		60%						
Aspect		Northwest						
Sensitive habitat present		Marine						
Regional and Neighboring Property Owners		Big Creek Reserve						
Potential Occurance of Rare Plant and Animal Species								
Eriogonum parvifolium								
Smith's blue butterfly								
Exotic Species Present (threat)								
Cortaderia jubata, Foeniculum vulgare								
Potential Occurance of Cultural Artifacts								
none								
<u>POTENTIAL FOR EROSION EVENT</u>		<u>(rank 1-10)</u>	<u>Importance</u>		<u>Urgency</u>		<u>Trend</u>	
			<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard			0	8	0	8	0	8
Baren soil surface rill and gully erosion present			0	8	0	6	0	8
Baren soil surface (temporary stockpiling)			0	2	0	6	0	8
Potential impacts to sensitive habitat			0	2	0	2	0	8
Potential impacts to engineered drainage and/or conveyance structure			0	4	0	2	0	8
Potential erosion control device (treatment) failure		(treatment failure)	0	8	0	8	0	2
Drainage problem source		Attempted drainage failed	0	0	0	0	0	2
Exotic species invasions			0	4	0	2	0	6
Revegetation			0	9	0	7	0	7
TOTAL			0	45	0	41	0	57



Figure 2.15.
Picture looking
north showing
sidecast with
no vegetation
present.

Figure 2.16. Picture
showing bare soils and
invasive weeds at the
highway edge, looking
south.



Figure 2.17. View of
unvegetated berm.

Table 2.9. Restoration Recommendations for Vista Point south of Big Creek.

Site # 9 Vista Point-South of Big Creek					
Site Objective	Restoration Recommendations				
	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization			Erosion control gullies and rills repaired	<i>Mimulus auranticus</i> , <i>Ceanothus thrysiflorus</i> , <i>Artemisia californica</i> , <i>Briklia californica</i> , <i>Stachys bulata</i>	Site stabilized, erosion present?
	Site requires permanent revegetation				
Revegetation			Reseeding, planting as required - Hydroseed downslope	Revegetate with permanent vegetation on berms	Is site revegetated, species diversity present?
Site Maintenance	Exotic species present: Pampas grass- fennel		Control of exotic species		Weeds controlled, exotic species less than 10% cover
					Non bio-degradable items removed
					Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	Required as project element	Report	Exotic species controlled		Project completed/success criteria achieved
					Project not completed- remedial measures required

North Vicente Creek Bridge



Figure 2.18. North Vicente Creek Bridge, February 2000.

Table 2.10. Erosion Site Analysis worksheet for North Vicente Creek Bridge.

Caltrans Erosion Site Analyses		North Vicente Creek Bridge					
SLO County Line Mile Post Marker	26.2						
Photo-Reference Number	13-01, 13-02, 13-03						
Site Conditions	Highway slumping, overcast soils, no weed control, soil flowing to intertidal zone, phone cable impact						
Habitat Type	Coast scrub						
Soil Type	Decomposed granite						
Slope	40%						
Aspect	West						
Sensitive habitat present	Smiths blue butterfly						
Regional and Neighboring Property Owners	Packard Ranch						
Potential Occurance of Rare Plant and Animal Species							
Eriogonum parvifolium							
Smith's blue butterfly							
Exotic Species Present (threat)							
Foeniculum vulgare, Cotaderia jubata, Silybium marianum							
Potential Occurance of Cultural Artifacts							
none							
<u>POTENTIAL FOR EROSION EVENT</u>		(rank 1-10)	Importance	Urgency	Trend		
			up slope	down slope	up slope	down slope	
Erosion Hazard			0	3	0	3	6
Potential slope failure			0	8	0	8	7
Baren soil surface rill and gully erosion present			0	5	0	5	5
Baren soil surface (temporary stockpiling)			0	8	0	8	7
Potential impacts to sensitive habitat			0	7	5	5	7
Potential impacts to engineered drainage and/or conveyance structure			0	8	0	5	5
Potential erosion control device (treatment) failure		(treatment failure)	0	2	0	2	2
Drainage problem source		Attempted drainage failed	0	0	0	0	0
Exotic species invasions			0	7	0	5	5
Revegetation			3	6	0	5	5
TOTAL			3	54	5	46	49



Figure 2.19. Recent road repair and sidecast with little erosion protection.



Figure 2.20. Sidecast, unstable soil, and invasive weeds.

Figure 2.21. Picture taken in early January 2001 shows very high berm obscuring views from the highway and pullout.



Table 2.11. Restoration Recommendations for North Vicente Creek Bridge

Site #10 North Vicente Creek Bridge					
Restoration Recommendations					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization		Hydroseed and straw	Manage sidecast- Remove material that is piled over two feet high	<i>Mimulus auranticus,</i> <i>Ceanothus thyrsiflorus,</i> <i>Artemisia californica,</i> <i>Bacharris pilularis, Lupinus albafrons</i>	Site stabilized, erosion present?
Revegetation	Upslope requires permanent revegetation mix		Reseeding, planting as required Site requires temporary erosion control on berms		Is site revegetated, species diversity present?
Site Maintenance	Exotic species present: Pampas grass- fennel		Control of exotic species Surface water diversion treatment needed immediately		Weeds controlled, exotic species less than 10% cover
Project Reporting	Required as project element	Report	Site maintenance actions recorded	Submittals review/ specified materials at hand Specified materials not available/ specify alternates	Project completed/success criteria achieved Project not completed- remedial measures required

Grandpa's Elbow



Figure 2.22. Grandpa's Elbow, February 2000.

Table 2.12. Erosion Site Analysis worksheet for Grandpa's Elbow.

Caltrans Erosion Site Analyses		Grandpa's Elbow							
SLO County Line Mile Post Marker		6.4							
Photo-Reference Number		3-01, 3-02, 3-03, 3-04							
Site Conditions		slumping upslope, side cast downslope, no bedrock visible							
Habitat Type		Redwood fringe, Ceanothus scrub, coastal scrub							
Soil Type		serpentine							
Slope		25%							
Aspect		West							
Sensitive habitat present		Riparian on north side							
Regional and Neighboring Property Owners		John Harlan, Provost							
Potential Occurance of Rare Plant and Animal Species									
Red-legged frog									
Smith's blue butterfly									
Eriogonum parvifolium									
Exotic Species Present (threat)									
Cortaderia jubata, Genista monspessulanna, Senecio mikanioides									
Potential Occurance of Cultural Artifacts									
historic structures on Harlan point									
<u>POTENTIAL FOR EROSION EVENT</u>		(rank 1-10)		Importance		Urgency		Trend	
				up slope down slope		up slope down slope		up slope down slope	
Erosion Hazard		2 4		2 3		2 2		2 2	
Potential slope failure		2 3		4 6		4 4		5 5	
Baren soil surface rill and gully erosion present		1 3		1 5		2 2		5 5	
Baren soil surface (temporary stockpiling)		3 2		2 2		2 2		2 2	
Potential impacts to sensitive habitat		4 4		3 5		5 3		5 5	
Potential impacts to engineered drainage and/or conveyance structure		2 1		2 1		2 2		1 1	
Potential erosion control device (treatment) failure		0 0		0 0		0 0		0 0	
Drainage problem source		0 0		0 0		0 0		0 0	
Exotic species invasions		2 2		1 1		2 2		2 2	
Revegetation		3 3		3 3		3 3		3 3	
TOTAL		19 22		18 26		20 25			



Figure 2.23. Sidecast left in early Spring 2000. As the year progressed, more sidecast was left behind due to road repairs at another location.

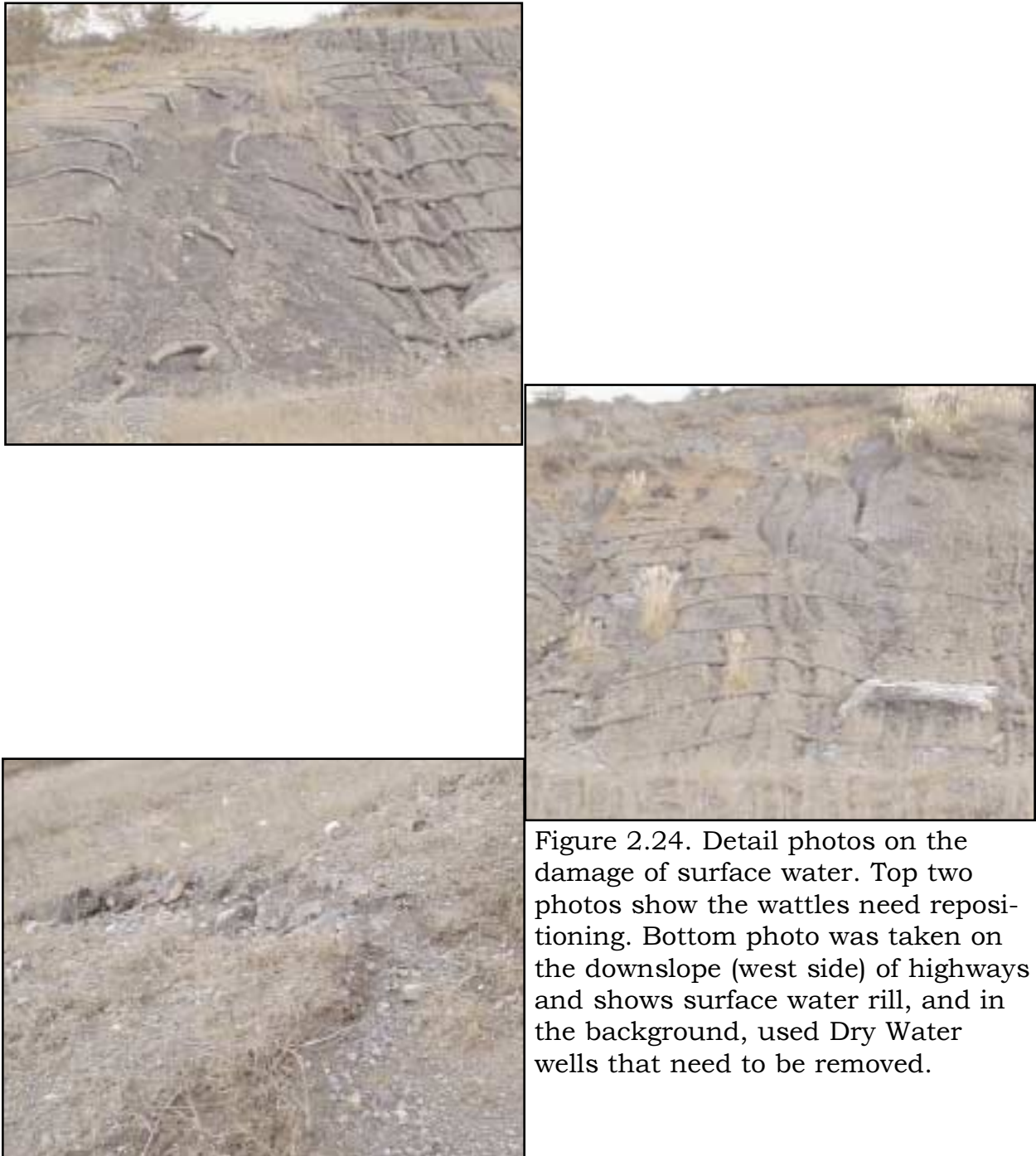


Figure 2.24. Detail photos on the damage of surface water. Top two photos show the wattles need repositioning. Bottom photo was taken on the downslope (west side) of highways and shows surface water rill, and in the background, used Dry Water wells that need to be removed.

Table 2.13. Restoration Recommendations for Grandpa's Elbow.

Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization	Continue remedial erosion control seeding upslope		Rill and gully erosion repaired	<i>Melica imperfecta</i> , <i>Festuca rubra</i> , <i>Lotus purshianus</i> , <i>Festuca californica</i> , <i>Trifolium gracilentum</i>	Is site stable?
	Anchor toe of slope where slippage occurs downslope		Control surface water flow away from downslope into control structure.		Is erosion present?
Revegetation		Willow pole cuttings in seeps and springs up and down slope		Plant willow poles in wet seeps Plant <i>Eriogonum parvifolium</i> at 48"O.C. revegetation seed mix	Is site revegetated with a diversity of species present?
Site Maintenance		Repair/replace straw wattles upslope	Dry water installation needs to be removed	Use of hydropost top soiling required	Are all non-biodegradable elements removed?
		There has been an approx. 35% loss of wattles upslope this year due to surface water damage.	Wooden stakes need removal Weed control: Fennel and Pampus grass		Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	No erosion present	Bio-engineering in place and functioning	Site maintenance actions recorded	Submittals review/ specified materials at hand	Project completed, success criteria achieved-Final Recommendations
	Erosion present/ recommendations	Bio-engineering needs remedial repair and/or maintenance		Specified materials not available/ specify alternates	Project not completed-remedial measures required

Willow Springs



Figure 2.25. Willow Springs, February 2000.

Table 2.14. Erosion Site Analysis worksheet for Willow Springs.

Caltrans Erosion Site Analyses		Willow Springs near Gorda							
SLO County Line Mile Post Marker		9.9							
Photo-Reference Number									
Site Conditions	Gully and mud flow to beach. Impacts to elephant seal haul out								
Habitat Type	coastal scrub								
Soil Type	serpentine								
Slope	100+								
Aspect	West								
Regional and Neighboring Property Owners		Caltrans Maintenance Yard,	Town of Gorda						
Potential Occurrence of Rare Plant and Animal Species									
Elephant seal									
Smith's blue butterfly									
Eriogonum parvifolium									
Exotic Species Present (threat)									
Eucalyptus globulus, Cortaderia jubata, Tropaeolum majus, Carduus pycnocephalus, Genista monspessulanna									
Potential Occurrence of Cultural Artifacts									
unknown									
		Importance		Urgency		Trend			
<u>POTENTIAL FOR EROSION EVENT</u>		<u>(rank 1-10)</u>		<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard		1	3	1	4	1	4		
Potential slope failure		1	5	1	5	1	5		
Baren soil surface rill and gully erosion present		1	5	1	5	1	5		
Baren soil surface (temporary stockpiling)		1	8	1	3	1	3		
Potential impacts to sensitive habitat		1	10	1	10	1	10		
Potential impacts to engineered drainage and/or conveyance structure		1	8	1	8	1	8		
Potential erosion control device (treatment) failure		1	4	1	4	1	4		
Drainage problem source		2	8	1	8	1	8		
Exotic species invasions		2	5	2	5	8	5		
Revegetation		5	5	5	5	5	5		
TOTAL		16	61	15	57	21	57		



Figure 2.26. Looking downslope facing south. View of large unvegetated gully.

Figure 2.27. Looking downslope facing south near road structure. Note irrigation lines, rebar, and other materials that may need removal. Vegetation seems well established at this previous restoration site.



Figure 2.28. Looking downslope and north showing bare soil, eucalyptus and pampas grass.

Table 2.15. Restoration Recommendations for Willow Springs.

Site # 15 Willow Springs					
Restoration Recommendations					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization	Needs permanent berm treatment downslope		Erosion control gullies and rills repaired downslope	<i>Salvia mellifera, Bromus carinatus, Eriophyllum steachadipolium, Eriogonum parvifolium</i>	Site stabilized, erosion present?
			Needs surface water diversion on downslope to control structure	Temporary erosion control before October 15th	No impact to sensitive habitat?
Revegetation	Downslope requires permanent revegetation mix-berm requires permanent berm seed mix	Willow wattles in wet gullies	Reseeding, planting as required		Is site revegetated, species diversity present?
Site Maintenance	Exotic species present: Pampas grass, Eucalyptus trees	Inspect and repair bio- engineering features (stakes removed)	Control of exotic species- Eucalyptus sprouts will need remedial spraying with Garlon	Reseed if native plant composition fails to replicate native habitat downslope	Weeds controlled, exotic species less than 10% cover
			Fertilization of seeded areas		Non bio-degradable items removed
			Control of trash-Area frequented by tourists		Monitor composition and plant density
Project Reporting	Required as project element	Bio-engineering measures successful	Site maintenance actions recorded	Submittals review/ specified materials at hand	Project completed/success criteria achieved
				Specified materials not available/ specify alternates	Project not completed- remedial measures required

Gray Slip



Figure 2.29. Gray Slip, February 2000.

Table 2.16. Erosion Site Analysis worksheet for Gray Slip.

Caltrans Erosion Site Analyses		Gray Slip					
SLO County Line Mile Post Marker		6.4					
Photo-Reference Number							
Site Conditions		slumping upslope and downslope, large areas of sidecast materials slumping					
Habitat Type		Central Coast Scrub					
Soil Type		Decomposed granite, bedrock					
Slope		60%					
Aspect		West					
Sensitive habitat present							
Regional and Neighboring Property Owners		USFS					
Potential Occurance of Rare Plant and Animal Species							
Eriogonum parvifolium							
Smith's blue butterfly							
Exotic Species Present (threat)							
Cortaderia jubata							
Potential Occurance of Cultural Artifacts							
none							
		Importance		Urgency		Trend	
<u>POTENTIAL FOR EROSION EVENT</u>	<u>(rank 1-10)</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard		1	4	2	4	2	4
Potential slope failure		2	2	3	6	3	6
Bare soil surface rill and gully erosion present		1	6	1	6	1	6
Bare soil surface (temporary stockpiling)		6	6	6	6	6	6
Potential impacts to sensitive habitat		9	3	9	3	9	3
Potential impacts to engineered drainage and/or conveyance structure		6	3	6	3	6	3
Potential erosion control device (treatment) failure	(treatment failure)	10	8	10	8	10	8
Drainage problem source	Attempted drainage failed	8	6	8	6	8	6
Exotic species invasions		8	6	8	6	8	6
Revegetation		6	8	6	8	6	8
TOTAL		57	52	59	56	59	56



Figure 2.30. Site photo showing storage of loose soil material. Revegetation work needs to continue to stop surface erosion.



Figure 2.31. gray slip upslope showing bare slope.

Table 2.17. Restoration Recommendations for Gray Slip.

Site # 16 Gray Slip					
Restoration Recommendations					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization	Needs permanent berm treatment up and downslope		Erosion control gullies repaired upslope	<i>Lupinus arboreus abramsii</i> , <i>stachys bulata</i> , <i>Lotus pursianus</i> , <i>Salix sitchensis</i>	Site stabilized, erosion present?
				Temporary erosion control before October 15th	Berm revegetated?
Revegetation	Plant willows along water drainages(sitka willow) upslope		Reseeding, planting as required	Revegetate with legume plants upslope	Is site revegetated, species diversity present?
			Remedial site regrading may be required upslope		
Site Maintenance	Exotic species present up and downslope		Control of exotic species	Reseed if native plant composition fails to replicate native habitat throughout site	Weeds controlled, exotic species less than 10% cover
			Fertilization of seeded areas upslope		Non bio-degradable items removed
Project Reporting	Required as project element		Site maintenance actions recorded	Monitor composition and plant density	Project completed/success criteria achieved
					Project not completed-remedial measures required

Redwood Gulch



Figure 2.32. Redwood Gulch, February 2000.

Table 2.18. Erosion Site Analysis worksheet for Redwood Gulch.

Caltrans Erosion Site Analyses		Redwood Gulch						
SLO County Line Mile Post Marker	5.2							
Photo-Reference Number	6-01, 6-02, 6-03							
Site Conditions	upslope large landslide							
Habitat Type	Central Coast Scrub, Redwood, Riparian							
Soil Type	Decomposed granite							
Slope	100%							
Aspect	West/Southwest							
Sensitive habitat present	Redwood forest, Riparian							
Regional and Neighboring Property Owners								
Eric Jensen, USFS								
Potential Occurance of Rare Plant and Animal Species								
Riparian draws, Red-legged frog, Steelhead trout, pond turtle								
Exotic Species Present (threat)								
Cortaderia jubata, Foeniculum vulgare								
Potential Occurance of Cultural Artifacts								
none								
<u>POTENTIAL FOR EROSION EVENT</u>		<u>(rank 1-10)</u>	<u>Importance</u>		<u>Urgency</u>		<u>Trend</u>	
			<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard			2	0	2	0	2	0
Potential slope failure			7	0	7	0	7	0
Baren soil surface rill and gully erosion present			5	0	7	0	7	0
Baren soil surface (temporary stockpiling)			3	0	7	0	7	0
Potential impacts to sensitive habitat			3	0	3	0	3	0
Potential impacts to engineered drainage and/or conveyance structure			8	0	10	0	8	0
Potential erosion control device (treatment) failure		(treatment failure)	3	0	2	0	3	0
Drainage problem source		Attempted drainage failed	3	0	2	0	3	0
Exotic species invasions			5	0	5	0	5	0
Revegetation			3	0	3	0	5	0
TOTAL			42	0	48	0	50	0



Figure 2.33. This site is large in scale. The top photo pictures the upslope, and the boxed area is shown enlarged in the bottom photo.



Figure 2.34. Redwood Gulch downslope looking north. Note pampas grass and old irrigation line.

Table 2.19. Restoration Recommendations for Redwood Gulch.

Site # 17 Redwood Gulch					
Site Objective	Restoration Recommendations				
	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization				<i>Nassella lepida, Lotus purshianus, Melica imperfecta, Lupinus benthamii, Baccahris pilukarus</i>	Is site stable?
Revegetation	Permanent berm vegetation on West side of road		Exotic species exceed 10% cover-remedial measures required		Is erosion present? Is site revegetated with a diversity of species present? Monitor gully on upslope face
Site Maintenance			Exotic species controlled Downslope exotic species control		Monitor culvert under road for blockage Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	No erosion present Erosion present/		Site maintenance actions recorded	Submittals review/ specified materials at hand Specified materials not	Project completed, success criteria achieved-Final Recommendations Project not completed-

Salmon Creek South



Figure 2.35. Salmon Creek South, February 2000.

Table 2.20. Erosion Site Analysis worksheet for Salmon Creek South.

Caltrans Erosion Site Analyses		Salmon Creek South						
SLO County Line Mile Post Marker		1.5 mile from sloc. Old USFS boundarysign						
Photo-Reference Number		5_01						
Site Conditions		slumping both sides of road, side casting, highway slumping						
Habitat Type		Central Coast Scrub						
Soil Type		Decomposed granite						
Slope		45%						
Aspect		West/Southwest						
Sensitive habitat present		Smith's blue						
Regional and Neighboring Property Owners		USFS						
Potential Occurance of Rare Plant and Animal Species								
Smith's blue butterfly								
Eriogonum parvifolium								
Exotic Species Present (threat)								
Foeniculum vulgare								
Potential Occurance of Cultural Artifacts								
no								
		Importance		Urgency		Trend		
<u>POTENTIAL FOR EROSION EVENT</u>		<u>(rank 1-10)</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>	<u>up slope</u>	<u>down slope</u>
Erosion Hazard			2	6	2	8	3	5
Potential slope failure			3	6	2	5	2	6
Baren soil surface rill and gully erosion present			4	7	4	6	4	6
Baren soil surface (temporary stockpiling)			1	1	8	1	1	4
Potential impacts to sensitive habitat			2	2	2	2	2	2
Potential impacts to engineered drainage and/or conveyance structure			5	6	6	8	8	1
Potential erosion control device (treatment) failure			2	2	2	2	2	2
Drainage problem source		Attempted drainage failed	6	1	4	5	7	7
Exotic species invasions			6	8	6	8	6	8
Revegetation			5	8	6	8	6	8
TOTAL			36	47	42	53	41	49



Figure 2.36. Slope pictured from Spring, 2000. Slope continued to erode until it closed the south bound lane. Roadway is under construction currently.

Table 2.21. Restoration Recommendations for Salmon Creek South. Shortly after this site was surveyed for this report, the western downslope gave way and closed the south-bound lane. A previous restoration effort near the site managed to stay stable. This older site should be regarded as a template for the current site, using jute netting and hydroseeding with the seed mix in the Table.

Site #18 Salmon Creek South - Site is currently under construction due to downslope failure					
Restoration Recommendations					
Site Objective	Erosion Control/ Revegetation	Bio-Engineering Applications	Site Maintenance Actions	Seed and Revegetation	Monitoring Actions
Site Stabilization	Temporary erosion control vegetation after construction downslope		Slope failure downslope - needs soil stabilization	Permanent revegetation not appropriate until site stabilized downslope. <i>Leymus condensatus, Melica imperfecta, Festuca rubra, Artemisia californica, Eriophyllum steachadifolium</i>	Is site stable? Is erosion present?
Revegetation		Jute netting and hydroseed downslope.	Site immediately south (at the Southern signal light) was a successful restoration downslope. Project is stable with good diversity of plants. Use as model.	Revegetate with temporary seed mix until downslope stable.	Did site revegetate?
Site Maintenance			Light weed infestation currently. Spray as necessary downslope.		If not hydroseed again Are exotic invasive plant species less than 10% of site coverage?
Project Reporting	No erosion present	Bio-engineering in place and functioning	Site maintenance actions recorded	Submittals review/ specified materials at hand	Project completed, success criteria achieved-Final Recommendations
	Erosion present/ recommendations	Bio-engineering needs remedial repair and/or maintenance	Exotic species exceed 10% cover-remedial measures required	Specified materials not available/ specify alternates	Project not completed-remedial measures required

Secondary Erosion and Revegetation Sites

Hurricane Point



Figure 2.37. Hurricane Point, February 2000.

South Forty



Figure 2.38. South Forty, February 2000.

Little Sur

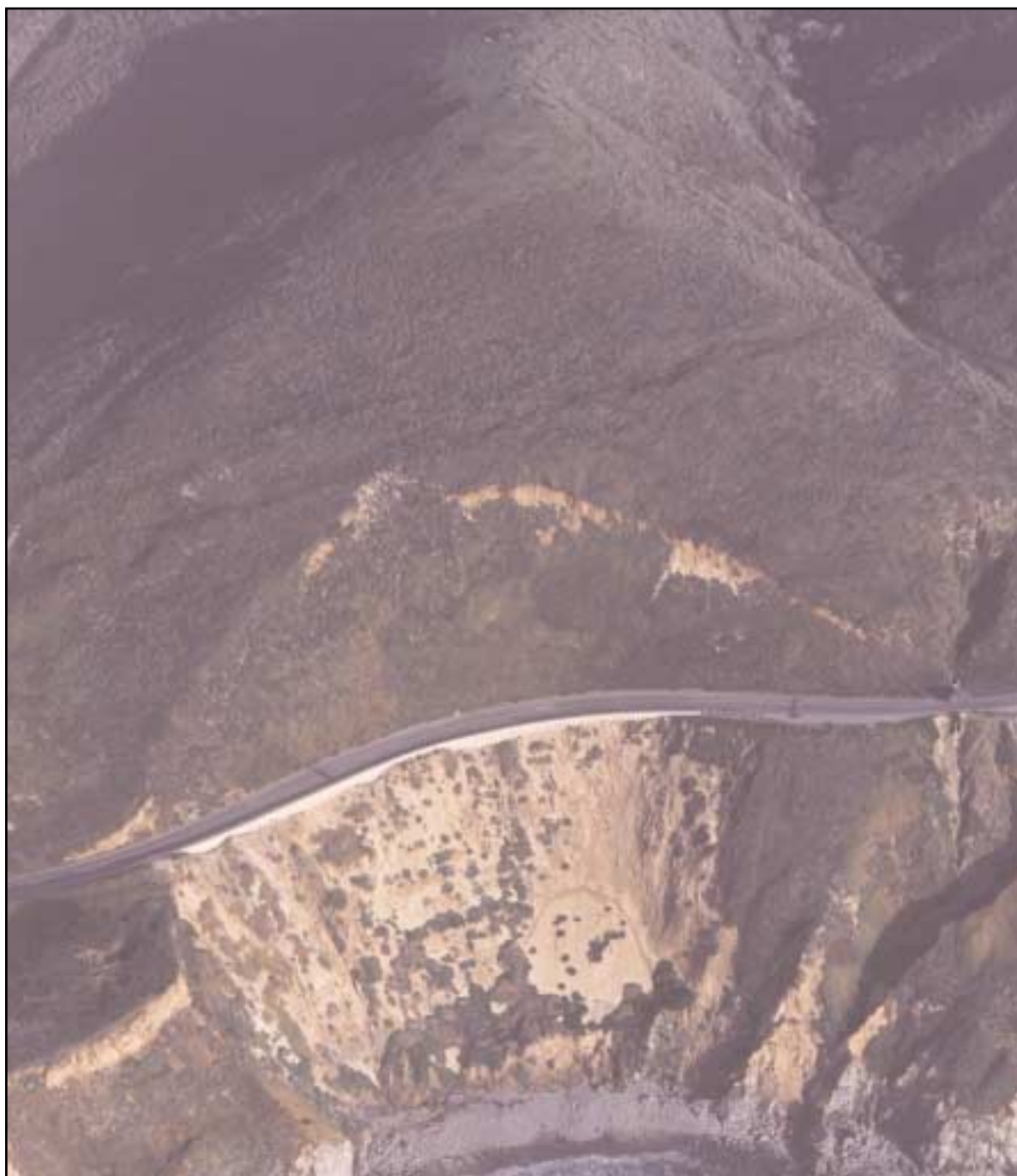


Figure 2.39. Little Sur, February 2000.

McWay North



Figure 2.40. McWay North, February 2000.

McWay



Figure 2.41. McWay, February 2000.

Blue Slide



Figure 2.42. Blue Slide, February 2000.

Limekiln



Figure 2.43. Limekiln, February 2000.

Cape San Martin

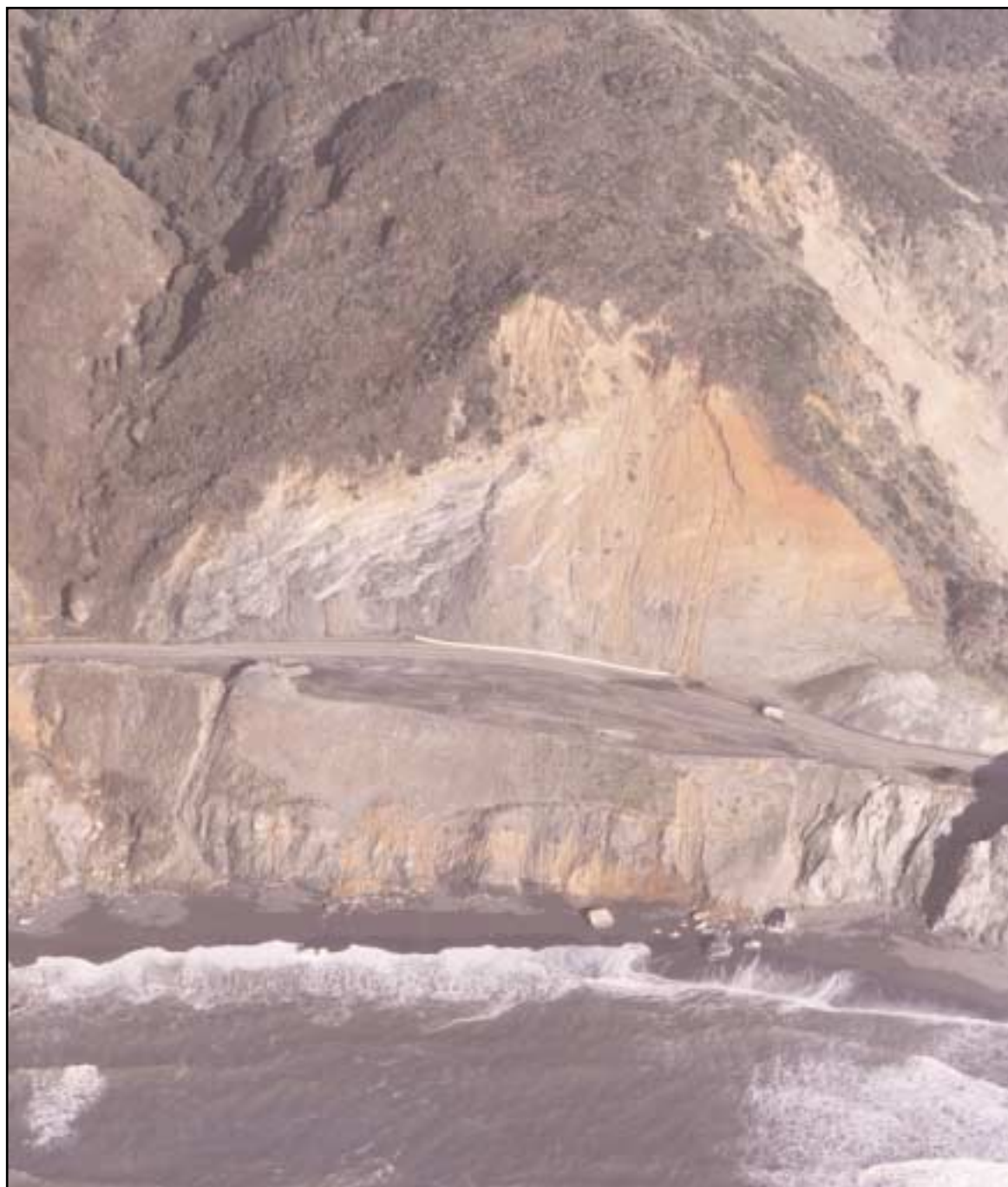


Figure 2.44. Cape San Martin, February 2000.